

### Abstract

Disclosed is a novel technique for transferring power and signals between two electrical devices over a single wire pair. In particular, a remote sensor is connected to a host device. Power to the remote sensor is supplied through a voltage reference and control loop circuit that holds the voltage component of the power signal present on the wire pair constant during remote current sensing. The remote sensor itself can transmit measurements or information by driving a load on the sensor and thereby modulating the loop current. The current signal in the sensor-to-host loop can be a precision AC analog signal or a serial digital bit stream. Both types of signals can coexist using a multiplexing scheme.